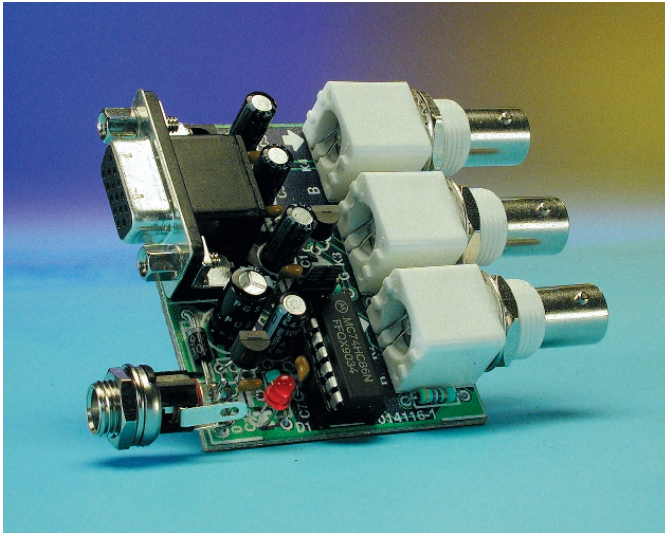


VGA-to-BNC Adapter

072

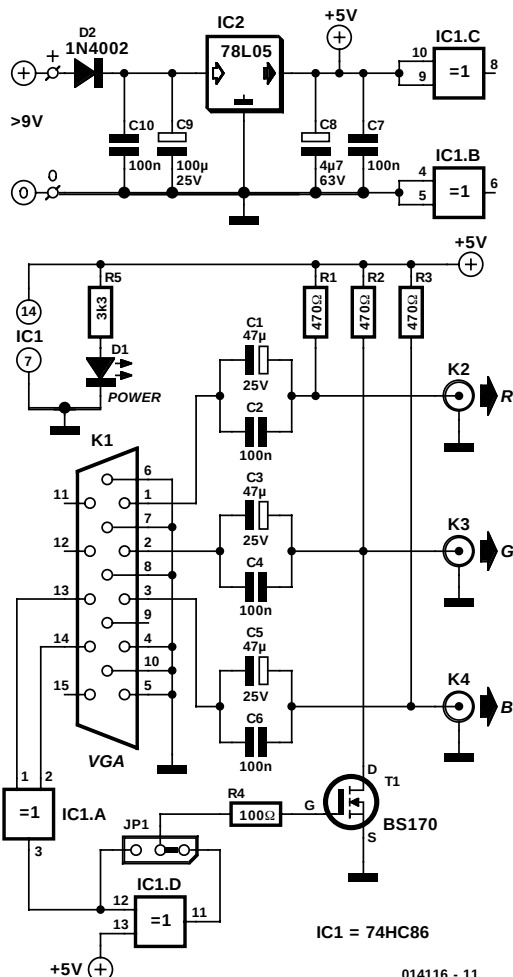


There are monitors which only have three BNC inputs and which use composite synchronisation ('sync on green'). This circuit has been designed with these types of monitor

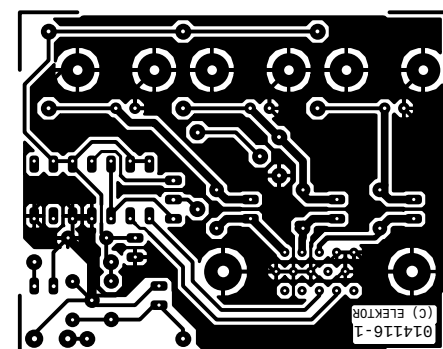
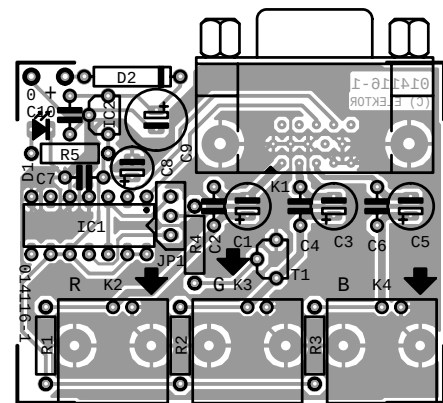
in mind. As can be seen, the circuit has been kept very simple, but it still gives a reasonable performance.

The principle of operation is very straightforward. The RGB signals from the VGA connector are fed to three BNC connectors via AC-coupling capacitors. These have been added to stop any direct current from entering the VGA card. A pull-up resistor on the green output provides a DC offset, while a transistor (a BS170 MOSFET) can switch this output to ground. It is possible to get synchronisation problems when the display is extremely bright, with a maximum green component. In this case the value of R2 should be reduced a little, but this has the side effect that the brightness noticeably decreases and the load on the graphics card increases. To keep the colour balance the same, the resistors for the other two colours (R1 en R3) have to be changed to the same value as R2.

An EXOR gate from IC1 (74HC86) combines the separate V-sync and H-sync signals into a composite sync signal. Since the sync in DOS-modes is often inverted compared to the modes commonly used by Windows, the output of IC1a is inverted by IC1b. JP1 can then be used to select the correct operating mode. This jumper can be replaced by a small two-way switch, if required. This switch should be mounted directly onto the PCB, as any connecting wires will cause a lot of interference.



PCB Design



Ultiboard
PCB Design

The PCB has been kept as compact as possible, so the circuit can be mounted in a small metal (earthed!) enclosure. With a monitor connected the current consumption will be in the region of 30 mA. A 78L05 voltage regulator provides a stable 5 V, making it possible to use any type of mains adapter, as long as it supplies at least 9 V. Diode D2 provides protection against a reverse polarity. LED D1 indicates when the supply is present. The circuit should be powered up before connecting it to an active VGA output, as otherwise the sync signals will feed the circuit via the internal protection diodes of IC1, which can be noticed by a dimly lit LED. This is something best avoided.

(014116-1)

COMPONENTS LIST

Resistors:

R1,R2,R3 = 470 Ω

R4 = 100 Ω

R5 = 3k Ω

Capacitors:

C1,C3,C5 = 47 μ F 25V
radial

C2,C4,C6,C7,C10 = 100nF
ceramic

C8 = 4 μ F 63V radial

C9 = 100 μ F 25V radial

Semiconductors:

D1 = LED, high-efficiency

D2 = 1N4002

T1 = BS170

IC1 = 74HC86

IC2 = 78L05

Miscellaneous:

JP1 = 3-way pinheader with
jumper

K1 = 15-way VGA socket
(female), PCB mount
(angled pins)

K2,K3,K4 = BNC socket
(female), PCB mount, 75 Ω